



Multi-purpose Handheld Sample Collection Registration & Tracking Device

**Los Alamos National Laboratory
AET-5 Homeland Defense Technologies Team
Torsten Staab and Craig Blackhart**

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Patented Technology Ready for Licensing and Manufacturing



❖ U.S. Patent Number 6,947,866 B2

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Handheld Sampler Gun

- ❖ State-of-the-art, multi-purpose sampling device
- ❖ Rapidly collects and tracks a wide variety of samples
 - Radiological
 - Chemical
 - Biological
- ❖ Adaptable sampling mechanism collects samples in various states
 - Solid
 - Liquid
 - Gaseous

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Handheld Sampler Gun

- ❖ “Hands-off” design approach
 - Effectively eliminates the risk of human and sample cross-contamination
- ❖ Multitude of highly integrated sensors for real-time, electronic recording and tracking
- ❖ Extensible, modular design

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One Device, Many Applications (Select List)

- ❖ Forensics
- ❖ Emergency Response
- ❖ Environmental Monitoring
- ❖ Industrial Hygiene
- ❖ Customs / Border Patrol
- ❖ Law Enforcement
- ❖ Fire Departments
- ❖ Military
- ❖ Agriculture
- ❖ Drug-Testing Programs
- ❖ Food Inspection
- ❖ Many more



Simulated application picture

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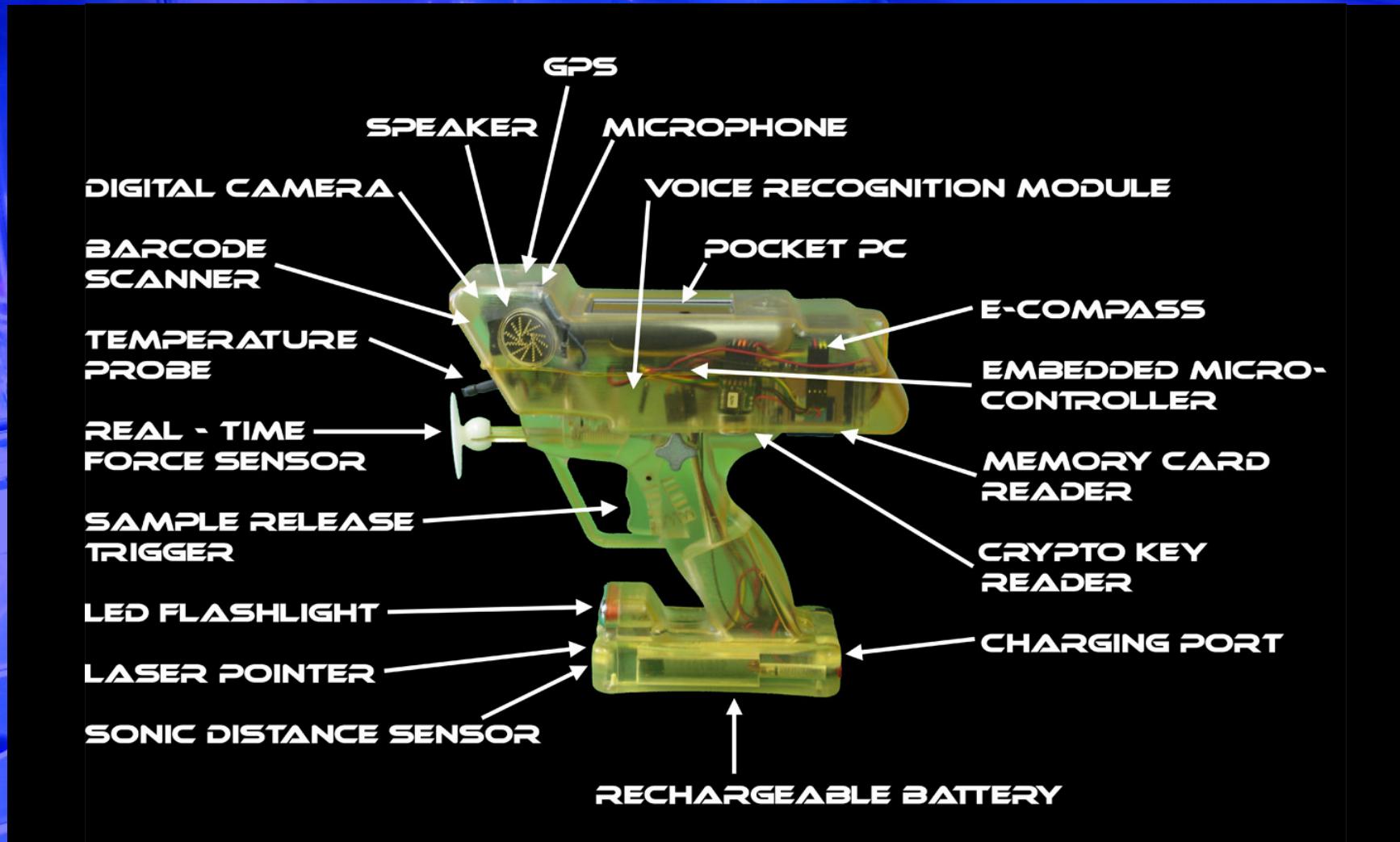
Inadequacies of Current Sampling Methods

- ❖ Field data acquisition usually done via pen and paper
- ❖ No automated data validation often resulting in incomplete and inconsistent field data
- ❖ Often requires time-consuming and error-prone post-collection data fusion in office/lab
- ❖ Usually requires multiple separate data acquisition devices
 - High operational overhead



*Traditional Method:
Time-consuming and error-prone
field data collection on paper*

Sampling Device Features



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Revolutionary Advantages

- ❖ Handheld device that is lightweight and mobile
- ❖ Device is operated by a rechargeable battery allowing for 8 hours of continuous use
- ❖ Sample data acquired and registered only once
- ❖ Field data can be acquired 10 times faster than traditional methods
- ❖ Minimizes/eliminates sample cross contamination and human exposure to hazardous samples

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Revolutionary Advantages

- ❖ Data integrity is ensured through high degree of device automation and integration
- ❖ Intuitive touch-screen interface provides effortless sample data collection
- ❖ Fully integrated multi-media (voice, video, text) for sample data acquisition and management
- ❖ Universal, XML-based data format is used to allow data export to virtually any back-office IT-system
- ❖ Removable memory card for transferring data from device to PC

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Revolutionary Advantages

- ❖ Adaptable sampling mechanism supports a wide variety of common media, such as swabs, wipes, contact plates, filter paper, vials, etc.
- ❖ Pinpoint and track sample locations using built-in GPS and graphical information system software
- ❖ Precisely map sampling area using integrated sensors



*Cross-contamination free
sample media pick-up and
delivery*

Revolutionary Advantages

- ❖ Improved sampling QC through real-time monitoring of
 - Pressure applied to sample media/object
 - Environmental temperature
- ❖ Barcode scanner can read 1D and 2D barcodes for sample registration and tracking
- ❖ User can take digital pictures of handwritten labels and sampled object/scene



Barcoded sample media

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Revolutionary Advantages

- ❖ Voice recognition enables user to speak commands for automatic, hands-off sample data registration
- ❖ Electronic scene sketching support
- ❖ Enhanced sample chain of custody support through software and hardware based authentication and encryption



User authentication with crypto button/key

Revolutionary Advantages

- ❖ Ad hoc air sampling [optional]
- ❖ Wireless data transmission [optional]
- ❖ Area being sampled is calculated using real-time tracking of sampling motion/patterns [optional]
 - Improved sampling QC
- ❖ Voice memos [optional]



Example of air sampling of a chemical storage cabinet

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Pocket PC Graphical User Interfaces (Set 1 of 3)

Start-up / Login screen

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Please insert the crypto key into the key reader. Make sure it makes contact at the center and side.

Exit Read Key

Collection Info

Batch ID: 345772

Select Current Collector: cbblackhart

Select Current Location: TA-46 Bldg 42

Collect Samples

Set Default ?

Batch Location Collector

Collection Info

Location: LA Post Office

Location Name: LA Post Office Add

Location Information: Site of suspicious mail found with unknown powder

Clear Form Delete

Batch Location Collector

Collection Info

Collector: mfinkerdink

Username: mfinkerdink Add

First Name: Mike Last Name: Finkerdink Phone: 555-555

Organization: FBI Email: mfinkerdink@fbi.com

Clear Form Delete

Batch Location Collector

to Set 2

Initial sample batch, collector, and location acquisition form

Sampling location acquisition form

Sample collector registration form

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Pocket PC Graphical User Interfaces (Set 2 of 3)

Sample batch registration form

from Set 1

Samples 6:01 X

Batch ID: 345772 LANL

Sample ID: 3413820070 Scan

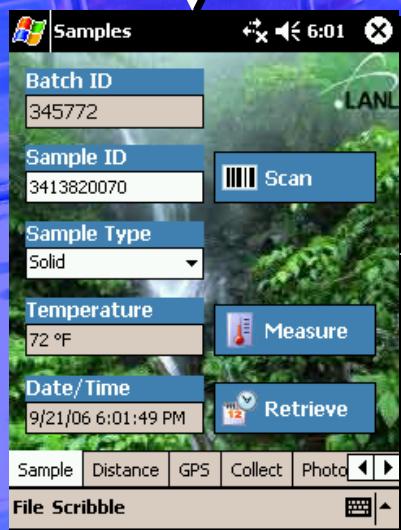
Sample Type: Solid

Temperature: 72 °F Measure

Date/Time: 9/21/06 6:01:49 PM Retrieve

Sample Distance GPS Collect Photo < >

File Scribble



Samples 11:56 X

Laser Pointer On LANL

Heading: 31° ESE Collect

Distance 1: 13 inches Measure

Distance 2: 19 inches Measure

Distance 3: 21 inches Measure

Sample Distance GPS Collect Photo < >

File Scribble



Samples 11:56 X

Longitude: 139° 44' 40" E LANL

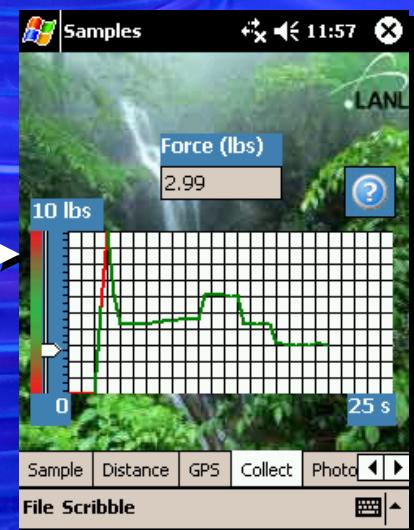
Latitude: 35° 37' 50" N Altitude: 0100 m

Satellites Used: 00 UTC Time: 06:28:27

Quality: Invalid Collect

Sample Distance GPS Collect Photo < >

File Scribble



to Set 3

Electronic compass & sonar measurement form

GPS data acquisition form

Real-time sampling pressure feedback display

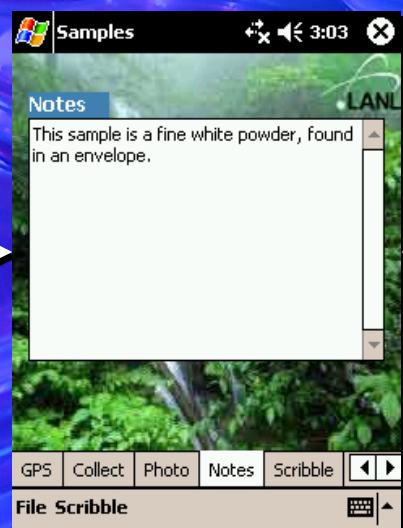
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Pocket PC Graphical User Interfaces (Set 3 of 3)

from Set 2



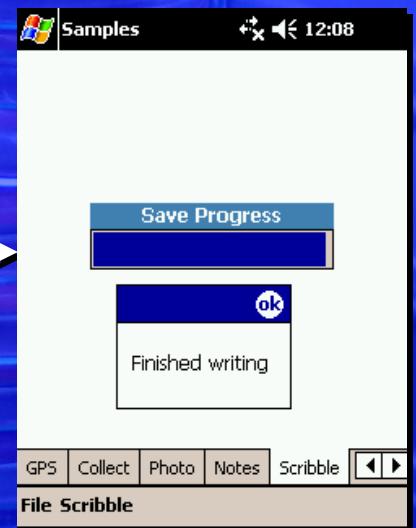
*Sample / scene
image acquisition
screen*



*Notes / comments
input form*



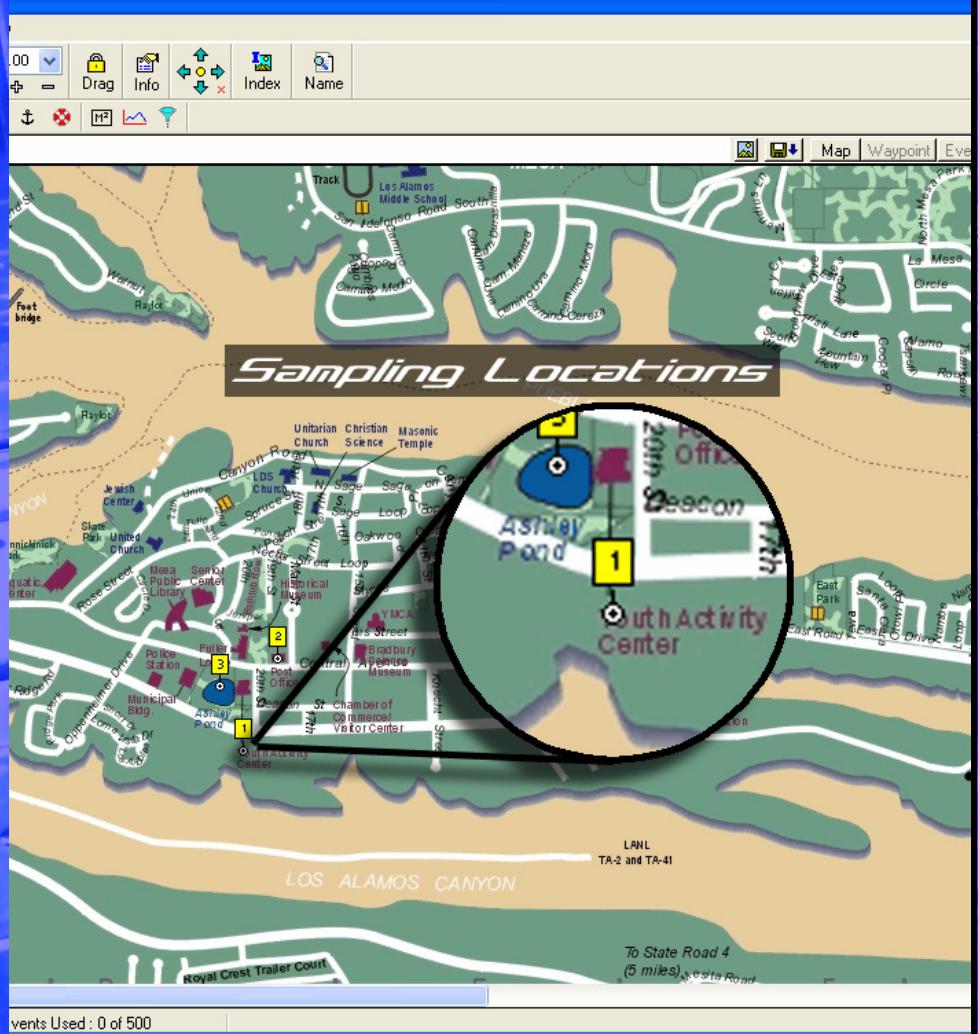
*Electronic scene
sketching form*



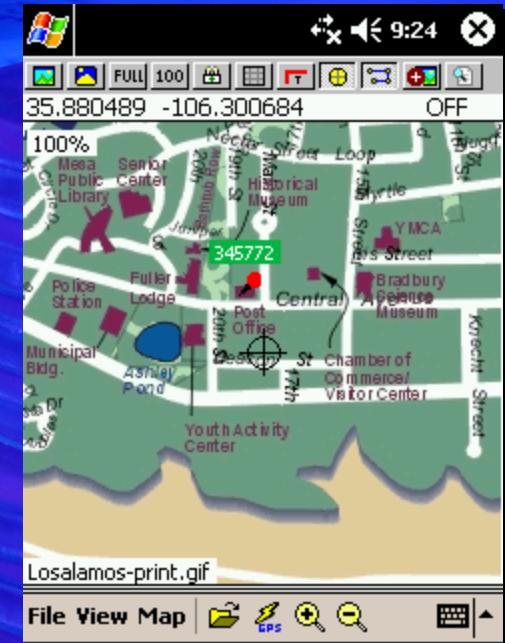
*Memory card data
export screen*

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Geographic Information System (GIS) Interfaces



Yellow boxes represent sampling location markers.



PC and Pocket PC
versions allow user to
track sampling
locations graphically

PC Graphical User Interface

Sampler Gun Data

File Sample Media

BatchId: test 4 Samples: 1111946

Collector Info

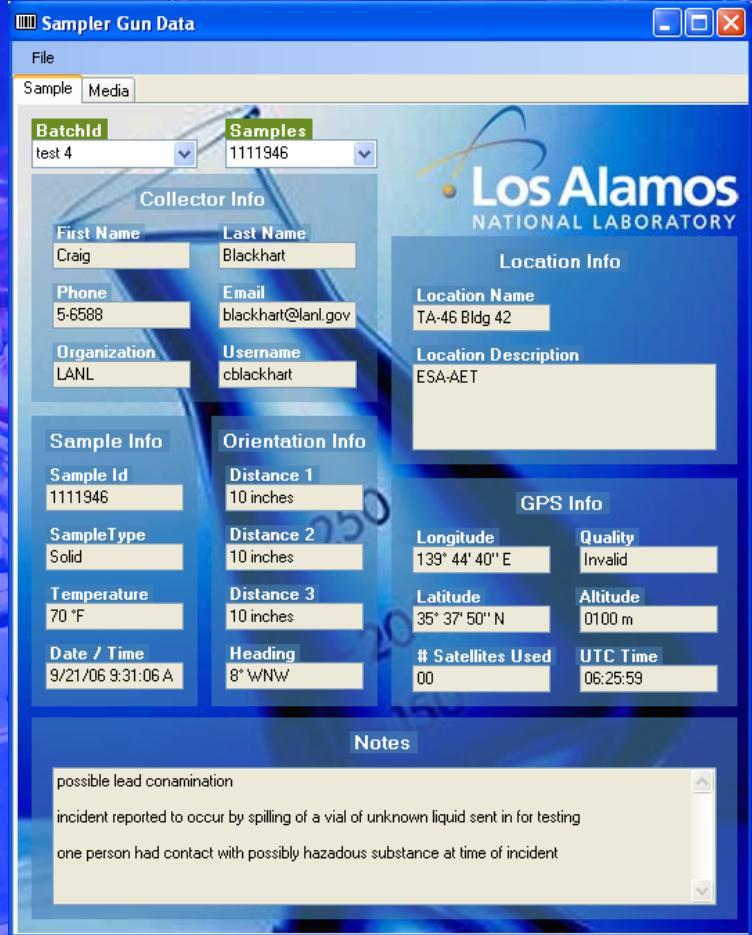
First Name: Craig	Last Name: Blackhart
Phone: 5-6588	Email: blackhart@lanl.gov
Organization: LANL	Username: cblackhart

Sample Info

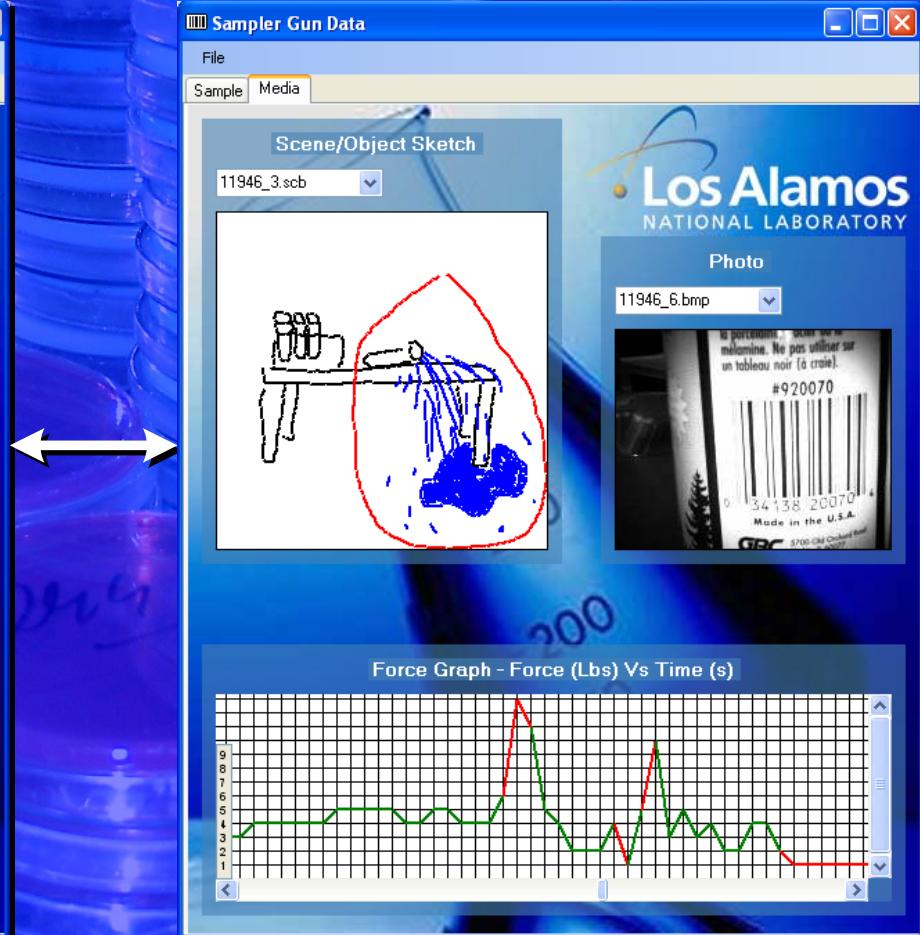
Sample Id: 1111946	Orientation Info
SampleType: Solid	Distance 1: 10 inches
Temperature: 70 °F	Distance 2: 10 inches
Date / Time: 9/21/06 9:31:06 A	Distance 3: 10 inches
Heading: 8°WNW	Longitude: 139° 44' 40" E
	Latitude: 35° 37' 50" N
	Altitude: 0100 m
	# Satellites Used: 00
	UTC Time: 06:25:59

Notes

possible lead contamination
incident reported to occur by spilling of a vial of unknown liquid sent in for testing
one person had contact with possibly hazardous substance at time of incident



Sample registration form



Sketching, imaging, and real-time force display screen

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Conclusions

- ❖ Faster, more accurate sample collection (speedup of 10x or higher)
- ❖ Minimizes risk of sample cross contamination
- ❖ Minimizes exposure risks to sampling personnel
- ❖ Simplifies field logistics and sample data acquisition
- ❖ Provides plug-n-play architecture to fit many domains
- ❖ Reduces required sampling staff by up to 50%
- ❖ Low total cost of ownership (one integrated device instead of n standalone field devices)

Contact

❖ For Licensing Information

- Veronique Longmire
- Phone: (505) 667-7539
- Email: vero@lanl.gov

❖ For Technical Information

- Torsten Staab
- Phone: (505) 665-7345
- Email: tstaab@lanl.gov

- Craig Blackhart
- Phone: (505) 665-6588
- Email: blackhart@lanl.gov

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